

**DELORME**

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Commercial Satellite Safety Communications for General Aviation

July 18, 2012

COMMERCIAL SATELLITE OPTIONS FOR GENERAL AVIATION SAR

Satellite Emergency Notification Devices (SENDs)

- Portable ruggedized handheld units
- Operate on commercial mobile satellite services (MSS)
- Third-party SAR coordination center relays distress calls to SAR responders
- Provide GPS tracking and messaging in addition to SOS
- Product category includes one-way and two-way solutions
- Stand alone device or paired wirelessly with user's smart mobile device
- RTCM SC-128 recommended standard submitted to FCC for implementation
- Lowest price in terms of equipment and airtime



COMMERCIAL SATELLITE OPTIONS FOR GENERAL AVIATION SAR

Flight Tracking Systems

- Typically installed in aircraft with external antenna – STC required
- Automatic flight following and on-demand position reporting
- May also include SOS functionality and automatic monitoring of aircraft instruments and installed systems
- More expensive than SENDs

Satellite Phones

- Handheld or installed with external antenna
- Provide full-duplex, high-quality voice telephony as well as narrowband data links
- May contain an embedded GPS receiver and dedicated SOS function
- More expensive equipment and airtime charges



DeLorme inReach™



- First affordable two-way SEND product for consumer and enterprise markets, introduced in October 2011
- SOS distress alerting with automatic visual acknowledgement of receipt
- Follow-Me Tracking and Find-Me Locating
- Up to three preprogrammed messages when in stand-alone mode
- Two-way free-form text messaging and emailing when paired with a smartphone or tablet, providing global connectivity when outside coverage of terrestrial cellular networks
- Meets RTCM recommended SEND standard for two-step SOS activation, reducing the likelihood of accidental false alarms

DeLorme inReach™



- Uses GEOS International Emergency Response Coordination Center for 24/7/365 call monitoring, false-alert screening, geolating emergency signal source, maintaining two-way communications with sender (when paired with smart mobile device), providing liaison with appropriate SAR responders
- User friendly web-based interface for viewing status, tracks and messages from inReach unit
- Ruggedized and tested to rigorous environmental standards
- Operates over the global Iridium satellite network

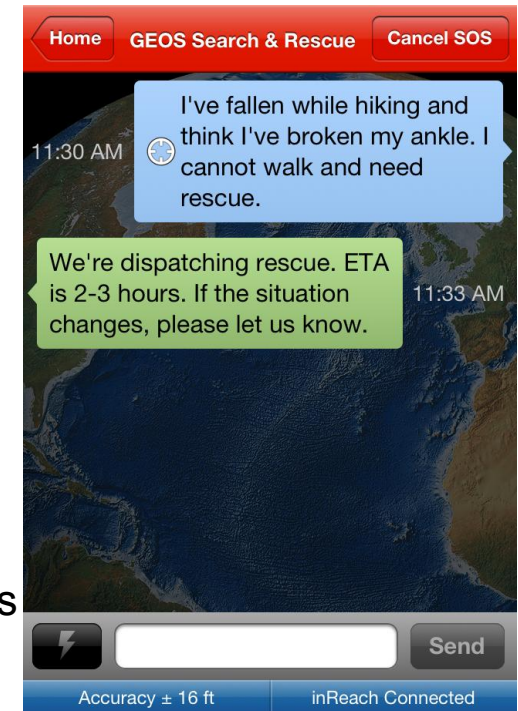
IRIDIUM SATELLITE NETWORK

- Only mobile satellite service offering true global pole-to-pole coverage
- Full duplex (two-way) short-burst data
- High network reliability, documented by Quality of Service (QoS) metrics
- Low-latency data links with end-to-end message delivery of less than 60 seconds anywhere on the planet
- Fully funded satellite replenishment program to commence in 2015
- Iridium NEXT hosted payloads will provide global ADS-B for oceanic and polar routes
- Widely used by government, enterprise and consumer customers for mission-critical tracking and two-way messaging with personnel and assets all over the world



ADVANTAGES OF TWO-WAY DATA LINKS FOR GA SAR

- Two-way Iridium data link provides a mechanism for SAR responders to communicate back to the SEND unit to:
 - Determine whether the call is a true emergency or a false alarm
 - Discover the nature of the emergency so as to respond with the appropriate resources
 - Reassure the sender that help is on the way
 - Communicate with user to get updates on the situation
 - View the “bread crumb trail” tracking prior to the SOS distress message
 - Ping the device with an on-demand location request at any time
 - Visual notification to inReach device acknowledging message receipt
 - Two-way text dialogue between sender and SAR responders when inReach paired with user’s smartphone or tablet



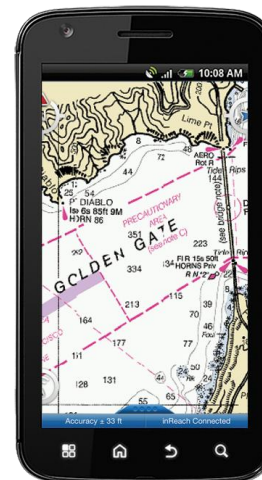
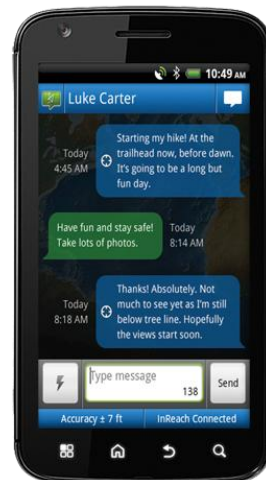
FOLLOW-ME/FIND-ME TRACKING AND LOCATING

- inReach takes the ‘search’ out of search-and-rescue:
 - Position tag automatically sent with SOS distress message
 - Position coordinates downloaded automatically at 2-minute intervals, without operator intervention, enabling SAR authorities to save valuable time finding the caller’s location if the ELT fails to function properly after crash
 - If passengers abandon the downed aircraft, SAR authorities “ping” the vessel at any time to get their accurate GPS position coordinates
 - Eliminates dependence on operator to manually initiate SOS call when fighting to keep aircraft from crashing



OFF-THE-GRID COMMUNICATION

- inReach can be paired wirelessly with the subscriber's Apple or Android smart mobile device
 - Send and receive free-form text messages and emails
 - Type in messages using smart mobile device keyboard and screen
 - Access the address book in the user's smartphone or tablet
 - Optimize smartphone or tablet for navigation
 - Free downloads of DeLorme topographical maps
 - Continue navigating when smartphone GPS switched off to save battery life
 - View trip history



SUMMARY

- New-generation SEND products offer an additional margin of safety for aircraft equipped with 406 MHz or 121.5 MHz ELT beacons.
- SEND products with two-way messaging provide an important return-link for SAR responders to interrogate the sender.
- SEND products meeting RTCM SC-128 recommendations reduce number of false alerts through two-step SOS message initiation.
- inReach provides unique value proposition for general aviation customers
 - SOS distress alerting with automatic acknowledgement of message receipt
 - Follow-me tracking with programmable reporting intervals down to 2 minutes
 - Find-me locating for on-demand position requests
 - Two-way text and email communication when paired with Apple or Android mobile device
 - Global, reliable, low-latency two-way data links through Iridium network
- Agreed-upon industry standards for SENDs under development
 - RTCM SC-128
 - ProTECTS Alliance
 - NSARC, USCG and USAF involvement





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YEAR-TO-DATE SOS CALLS FROM INREACH

- 30% were false alarms, sender contacted by GEOS, SOS cancelled, no SAR response needed.
- 70% were actual emergencies.
 - 37% marine
 - 13% motor vehicle accidents
 - 50% hikers
- 60% of actual emergencies were from stand-alone inReach, in all cases sender confirmed actual emergency after being notified by flashing LED from GEOS that SOS was received.
- 40% of actual emergencies were from paired inReach devices, in all cases sender engaged in two-way text communication with GEOS to exchange info on the emergency and status of SAR response.

